AIRCLEAN 48

High-pressure cleaner

USER MANUAL

Produced in Norway for:

Wilhelmsen Ships Service

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E.1 **IMPORTANT INFORMATION**

E.1.1 Safety

Never point the gun at yourself or anybody else and hold it with both hands when spraying. A high-pressure spray can penetrate the skin causing serious injury.

Before service work, always disconnect the air supply.

When cleaning, it is strongly advisable to use protective goggles, wear protective gloves and protective clothing.

Never spray electrical equipment or cables unless you are sure that the installation stands high-pressure cleaning.

Be sure that any part to be fitted withstands the pressure.

If the cleaning unit is to be used in a hazardous environment, earthing the equipment will eliminate static electricity.

Airclean is CE-marked.

E.1.2 Lubrication

The air motor **requires** lubricated air. In order to ensure uninterrupted steady operation you must never let the fitted air lubricator run dry. The correct position of the adjustment screw is approx. 1/2-1 turn.

E.1.3 Air operating pressure

Do not exceed maximum safe air operating pressure specified in data sheet, enclosure 1.

E.1.4 Frost protection

If frost is expected, the waterside must be emptied to prevent damage by frost. This is simple. Disconnect the water supply and let the unit run some strokes until the pump, hose, spray gun and extension tube is empty. Or change over the air supply to the water intake and blow the waterside dry.

E.1.5 Guarantee

The guarantee is not valid for damages caused by erroneous usage or if the unit has been disassembled without written permission from the manufacturer.

E.2 **DESCRIPTION AND OPERATION**

E.2.1 Pump unit

The pump unit comprises a single acting pump powered by a double acting air motor. An air shuttle valve that changes the air direction when the piston reaches the end positions controls the air motor.

E.2.2 Water inlet

The connection is marked "**Water**". Use a water supply hose with minimum diameter as specified in enclosure 2 "Dimensioning of water- and air inlet". It is recommended to connect a low-pressure hose of minimum 3 meters length to the water inlet of the unit to prevent shock in the water system.
The suction head capacity of the pump is reduced with increasing temperatures. Increased supply pressure may therefore be required when pumping hot water. The suction line must be free from leeks. Claw couplings are not suitable for suction lines with pressures below atmospheric pressure.

E.2.3 Air inlet

The air connection is marked "**Air**". Use air supply hose with minimum diameter as specified in enclosure E.2 "Dimensioning of water- and air inlet". Do not fit valves, fittings etc. with less diameter than specified in enclosure E.2. If regulation is required at the unit, it is recommended to fit a full-bore ball valve and use this for throttling the air supply. If you are going to use an air pressure regulator it must be plentiful dimensioned for the airflow.

E.2.4 Chemical dosing

A high-pressure injector fitted between the high-pressure pump outlet and the high-pressure hose may dose chemicals. You may need to turn down the water pressure by throttling the air motor to achieve that the injector will work properly. We recommend to disconnect the injector when not in use because it "steals" pressure.

E.2.5 Cleaning procedures

Hot water, if available, will always give the best result and reduces the need for chemicals. The following procedures are recommended to get the best result when working with detergents:

- Apply the detergent with a wide-angle spray. Start at the bottom and move upwards. The spray distance should be approximately 40 cm.
- Leave the detergent to work approx. 3 minutes, or according to the manufacturer's instructions. However, do not let detergent dry on the surface.
- Start cleaning from the bottom and move upward. This prevents water to run down and dilute detergent below. The spraying distance should be 10 – 30 cm.
- When cleaning is completed, wash down from the top to prevent stains. Use water generously.

E.2.6 Accessories

The Airclean standard scope of supply is tailored to cater for ordinary cleaning tasks in an efficient and economic manner. Special demands are met by made suit accessories, which may be procured when needed. Such accessories include:

- Chemical injector.
- Turbo nozzles and other nozzle types.
- Sand blasting set for cleaning and de-scaling rusty steel structures etc.
- Nozzles for opening clogged tubes.
- Foam set for soap, disinfectants etc.
- Air filters, water filters, couplings for water and air.
- Extension tubes and extra hoses.
- Airclean wheel lance. Complete lance system for efficient washing of high walls, ceilings etc.
- Hose drums.

E.3 **MAINTENANCE**

E.3.1 Preventive maintenance

Preventive maintenance is limited to filling of lubrication oil, visual inspection and cleaning. Particular attention should be paid to high-pressure leaks and high-pressure hose. High-pressure leaks should be repaired straight away as they may increase rapidly if left unattended. The method of repair depends on where the leaks occur:

a. Pump Seal

A leak pump piston seal will cause a flow of water out of the drain hole on the bottom side of the pump cylinder.

b. Threads

All threads are BSP standard. The sole exception is the spray nozzle, which is NPT. All threads are assembled with sealing liquid, and leaks will normally never occur. However, if leaks should occur the threads must be cleaned and reassembled using either a sealing liquid or thread tape.

c. High-pressure hose couplings

The high-pressure hose couplings have metal-to-metal seals. To stop a leak, tighten the nut until the leak stops. If this does not work, open the coupling and inspect the sealing surfaces.

High pressure cleaning is the best method for cleaning the unit.

If the plant air is contaminated, for instance by rust, an air filter should be fitted. A water filter should be fitted if the water contains abrasive particles.

E.3.2 Pump Unit Dismantling

The pump unit is assembled by means of lock rings and may be split at A or B (Pump unit drawing). For access to the pump piston seal undo the tie bolts.

E.3.3 Change of pump piston seal

a. Loosen the attaching bolts.
b. Pull the cylinder of the piston.
c. Check the cylinder for scratches to see if honing or a replacement is required.
d. Remove the lock pin for the front part of the piston and screw it off. Fit o-ring, pump seal and front part of the piston.
e. Fit new slide rings.
f. Lubricate piston, seal and slide rings to ease reassemble and prevent damages at start up.

Reassemble sequence is opposite to dismantling, but note the following:

g. Tighten the attaching-bolts two and two opposite at a time. Sealing liquid should be applied to the bolts.

E.3.4 Pump valves

The valve seats are fixed and are not removable. Proceed as follows to inspect/renew balls or springs:

a. Undo attaching bolts and pull free the pump head to gain access to the inlet valve. The outlet reducer is fitted with sealing liquid.
b. Clean and inspect parts. Remove loose scale etc. Replace worn parts.
c. Clean threads.
d. Fit parts according to drawing.
e. Use sealing fluid on outlet reducer threads when assembling. Tighten opposite bolts to avoid skewing.

E.3.5 Valve shuttle

a. Unscrew threads end cover, remove dampening ring and pull out the valve shuttle.
b. Dismantle, clean, inspect and replace parts as required.
c. Re-assembly is done in reversed order. Screw in and end cover till it bottoms.

E.3.6 Valve rod sealing

a. Split pump unit by pulling lock ring B (See drawing)N5.
b. Dismantle, clean, inspect and replace worn parts as required.
c. Lubricate all o-rings prior to re-assembly.
d. Re-assembly is done in reversed order.

Symptom	**Possible Cause and Solution**
1. Low delivery/pressure	a) Restricted air supply. See E.2.3 “Air inlet”. Clean filters in the air supply. Open closed valves. b) Inadequate air supply capacity. Check compressor capacity. (See data sheet). Wrong nozzle bore. Change nozzle. Worn out nozzle. Change nozzle.
2. Uneven operation	a) Inadequate lubrication. b) Insufficient air supply
3. Pump failure to start	a) Pressure gauge on unit shows there is pressure: Clogged nozzle. Disconnect air supply and check for ice plug. b) Pressure gauge on unit shows no pressure: Closed air supply. Clogged air supply. No pressure in the air system.
4. Pump runs without delivery or low delivery	a) Closed water supply. Check any valves and filters in the supply. b) To large suction head. c) Undersized valves/fittings in the supply. d) Blocked/restricted air supply. e) Leaking pump piston seal.
5. Water/air leakages	a) Defect pump piston seal or other seals
6. Pump over-speeds with no or low delivery	a) Lacking or no water supply. Check valves and filters. b) To high suction head. c) Restrictions in water supply. d) Leaking pump piston seal.
7. Pump runs after trigger is released	a) Pump inlet valve is damaged or blocked in open position. b) Leaking pump piston seal.
8. Pulsating spray	a) Leaking suction line. b) Only 1 pump is working
9. Air motor stops and blows air	a) Damage to o-ring seal(s) on air motor. Seals must be changed.

E1 **Data sheet**

Airclean	***48***
Pressure ratio	**48 : 1**
No of cylinders	2 pcs
Air motor cylinder diameter	125 mm
Pump cylinder diameter	18 mm
Stroke	75 mm
Capacity	0-19 l/min
Air consumption (free air, 1 bar)	0-9 m3/min(150 l/s)
Recommended air pressure	5-11 bar
Pump pressure	0-480 bar
Maximum inlet water pressure	25 bar
Suction head up to	4 m
Maximum inlet water temperature	150 °C
Water inlet nozzle	3/4'' BSP female
Air inlet nozzle	3/4'' BSP male
High pressure outlet	3/8'' BSP male
Length overall	720 mm
Width overall	520 mm
Height overall (pump cart)	980 (540) mm
High pressure hose	3/8''x10 m
Weight complete incl. hose, gun and lance	59 kg
Extension tube lenght	800 mm

MATERIALS

Pump head	Nickel and chrome plated st
Pump valve seats	Stainless steel AISI 316
Pump valve springs	Stainless steel AISI 301
Pump piston seal	PTFE/Carbon
Piston rod	Stainless steel AISI 303
Valve ball	Stainless steel AISI 420B
Pump cylinder	Stainless st. SS2387. Hard.
Air cylinder	Nickel and chrome plated st
Valve rod	Stainless steel AISI 303
Frame	Nickel and chrome plated st
Tube parts	Galvanized steel
Cover	Vacuum formed ABS
Bolts	Hot galvanized steel
Spray gun	Stainless steel/plastic
Extension tube	Stainless steel AISI 316
High pressure nozzle	Stainless steel AISI 316

The unit will be delivered complete with	10m high pressure hose with spray gun, extension tube, spray nozzle, press. gauge, air lubricator and exhaust air muffler.

Subject to be improved without notice

RECOMMENDATIONS Airclean 48
HOSE DIMENSIONS

Water supply

Use minimum 3/4’’ hose. If the supply pressure is low or the hose is long, a 1’’ hose is recommended.

Air supply

Use minimum 1’’ hose.
Do not fit valves or fittings with less inner diameter than 19 mm.

E3 **Part list**

AIRCLEAN 48

PART NO U1200 PUMP UNIT

Part No	Description	Pos no	Qty.
P1002	Pump head	1	1
P1037	Hex nut	2	1
P1003	Stud screw	3	1
P1204	Piston rod	4	1
P1157	Glide ring	5	1
P1106	Air piston	6	1
P1007	Valve ball	7	2
P1008	Hex screw	8	4
P1019	Reduser	9	1
P1010	Spring	10	1
P1040	Pump cylinder	11	1
P1012	Cylinder cover	12	1
P1005	Spring	13	1
P1041	Pump piston	14	1
P1042	Glide ring	15	2
P1119	Ring	16	2
P1035	End cap	17	1
P1043	Pump packing	18	1
P1044	O-ring	19	1
P1045	O-ring	20	1
P1024	O-ring	21	5
P1123	O-ring	22	2
P1026	O-ring	23	6
P1025	O-ring	24	6
P1159	O-ring	25	6
P1158	Liner	26	1
P1166	Sleeve	27	1
P1027	Air cylinder	28	1
P1134	Valve shuttle	29	1
P1267	Valve housing	30	1
P1016	Snap ring	31	2
P1164	Sleeve	32	1
P1236	Valve rod	34	1
P1168	O-ring	35	1
P1080	Elbow	36	3
P1081	Hose nipple	37	2
P1082	Return line	38	1
P1083	Hose clip	39	2
P1084	Adapter	40	1

E4 **Pump drawing**